Effective 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R.4818)

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	$500.00

Complete if Known	
Application Number	09/922,060
Filing Date	August 3, 2001
First Named Inventor	Deepak K. PAI
Art Unit	1753
Examiner Name	Kishor Mayekar
Attorney Docket Number	12492.0047

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: **19-4293** Deposit Account Name: **Steptoe & Johnson LLP**

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING,SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee($)	Fee($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims	Fee($)	Fee Paid($)
0	-20 or HP+	0	x 50	= $.00

HP = highest number of total claims paid for, if greater than 20

Indep. Claims		Extra Claims	Fee($)	Fee Paid($)
0	-3 or HP+	0	x200	= $.00

HP = highest number of independent claims paid for, if greater than 3

Multiple Dependent Claims Fee($)	Fee Paid ($)
___	180.00

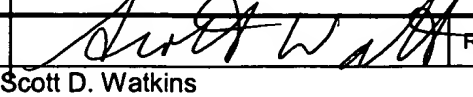
3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entitiy) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
- 100 =	0	0	$250	$0

(round up to a whole number)

4. OTHER FEE(S) **APPEAL BRIEF** Fees Paid ($) **$ 500.00**

SUBMITTED BY					
Signature		Registration No. 36,175	Telephone	(202) 429-3000
Name (Print/Type)	Scott D. Watkins		Date	8/15/06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Applicant: Pai

Group Art Unit: 1753

Serial No.: 09/922,060

Examiner: Kishor Mayekar

Filed: August 3, 2001

For: DIELECTRIC BARRIER
DISCHARGE PLASMA REACTOR CELL

APPEAL BRIEF

Commissioner of Patents
Customer Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Dear Sir:

Further to Applicants' Notice of Appeal filed on June 28, 2006, herein follows Applicant's Appeal Brief for the above-captioned case.

I. Real Party in Interest

General Dynamics Advanced Information Systems, Inc.

II. Related Appeals and Interferences

None.

III. Status of Claims

Claims 1-11 and 13-26 are pending in the application. All have been twice rejected and are the subject of the instant appeal.

IV. Status of Amendments

Applicants' last amendment of October 12, 2005, has been entered. Applicant's Reply under 37 CFR 1.116 was considered but was found not to place the claims in conditions for allowance.

V. Summary of Claimed Subject Matter

Independent claims 1, 35 and 36 generally recite a dielectric barrier discharge plasma cell that includes a dielectric spaced apart from a conductor. The dielectric includes various surfaces, a conductive coating and a protective coating. The cell is adapted to generate plasma in the space between the conductor and the dielectric, the plasma removing harmful agents from atmosphere in the cell. The dialectic and the conductor are positioned to create a turbulent airflow there between.

VI. Grounds of Rejection to be Reviewed on Appeal

Claim 1-7, 9-11, 13-17, 19-21, 24-34, and 36 have been rejected under 35 U.S.C. § 103 as obvious over Gadow in view of Kinney. Claims 8, 18, 22 and 23 were rejected under 35 U.S.C. § 103 as obvious over Gadow in view of Kenny and Racca. Claim 35 has been rejected under 35 U.S.C. § 103 as obvious over Gadow in view of Kinney and Iwanaga. Applicant requests review and reversal of the rejection of all pending claims. The status of all claims is rise and fall with the status of independent claims 1, 35 and 26.

VII. Argument

The instant application, filed a few weeks before the September 11 terrorist attacks, is directed to a methodology for eliminating chemical agents and biological pathogens (collectively referred to in the application as "harmful agents") from the air. A plasma cell, in which an AC current is applied between a dielectric and a conductor, generates electrically neutral gas molecules, charged particles in the form of positive ions, negative ions, free radicals and electrons, and electromagnetic radiation (photons) permeating the plasma-filled space there between. These species are highly reactive and can rapidly decompose other inorganic and organic compounds. Contaminated air passing through the plasma cell will exit substantially contaminant free.

An exemplary application of such technology would be in an air conditioning system. Recent television shows such as "24" illustrate how biological and chemical agents introduced into a ventilation system can rapidly spread throughout a building to afflict all of its occupants. One or more plasma cells according to the present invention strategically placed in such a

ventilation system would substantially neutralize such contaminants in the air before they reach the building occupants.

Plasma cell technology relies upon applying an AC voltage to a spaced apart dielectric and a conductor to generate the plasma there between. Applicants have discovered that the dielectric and the conductor can be arranged to induce turbulence in the flow of gas through the plasma cell, which results in various beneficial effects. Fig. 7 of the application shows a non-limiting example of a structure which is positioned to create such turbulence. All of independent claims 1, 35 and 36 recite this feature.

The pending rejections consider the above claims to be met by the combination of Gadow (US 5,955,038) and Kinney (US 3,622,492). Gadow is considered to teach all of the elements of, *e.g.,* claim 1, except for the feature of the conductor and dielectric being arranged to induce turbulencee in gas flow. The Office Action ostensibly turns to Kinney for its teachings of "an ozonier the creating of turbulence in the gas stream within the space between the conductor and dielectric" and thus would be an obvious combination with Gadow.

Kinney discloses a spaced apart dielectric and conductor. However, nothing in the position of these elements appears to create any turbulence in the airflow. To the contrary, Kinney teaches the use of other components to provide turbulence: "the gas stream may be baffled or otherwise manipulated to become turbulent with the species between electrodes and dielectrics . . ." Column x, lines x-y. In the Advisory Action, the Examiner interpreted this disclosure as calling for a baffle between the dielectric and conductor. Advisory Action Continuation Sheet, paragraph 1.

At best, the above teachings would motivate one of skill to add baffles to the Gadow structure to induce turbulence. However, nothing in Kinney teaches or suggests that the

dielectric and the conductor are responsible for the creation of turbulence, or that their position is responsible for inducing turbulence, as recited in the independent claims. The above compensation of references therefore fails to teach or suggest that the conductor and dielectric *be positioned* to create that turbulence, as recited in the pending independent claims.

Applicant pointed out the above deficiencies of the applied references in the Reply Under 37 CFR 1.116. In the subsequent Advisory Action, the Examiner stated that Kinney's teachings of baffling the gas flow stream would require a baffle attached to either the dielectric or the conductor, which would "be equivalent" to the braided electrodes in Fig. 7 of the instant application (which provides exemplary support for the claimed structure). It is unclear to Applicant as to how the Examiner reaches this factual conclusion of equivalents, or its legal bearing on the rejection for obviousness.

Considerations of equivalents during patent prosecution is limited to claim terms covered by 35 U.S.C. § 112, paragraph 6, under which claims recited in "means plus function" format cover the disclosed structure and equivalents thereof. However, the pending claims do not recite "means" limitations, and thus do not evoke considerations of equivalents. Applicant is unaware of any decision in which a non-means claim limitation was considered obvious because prior art was considered "equivalent." Just because something may be "insubstantially different" from the prior art does not translate to a teaching or motivation in the art to combine references to reach a claimed invention, regardless of the degree of distinction there between.

Indeed, it is not even clear on what basis the Examiner considers the claimed invention to equivalent to the teachings of the prior art.[1] Converting the dielectric or conductor into a baffled

[1] If this were a "means" analysis, the MPEP establishes that the Examiner could stand on a simple finding of equivalents and transfer the burden of proof to the Applicant to demonstrate why a structure was not equivalent. However, as noted above, this is not a means analysis.

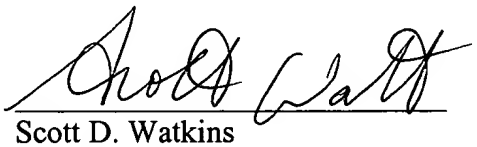
structure would create an uneven gap with the opposing surface. As the present application states on page 13, such a non-uniform relationship between the dielectric and the conductor will impede optimal neutralization of harmful agents in the gas. This cannot be viewed as an insubstantial difference.

The additionally cited Racca and Iwanaga have been cited against other features of the claims. Nothing in these references teaches or suggests what is lacking from the base combination of Gadow and Kenny and Racca.

All pending claims are therefore patentably distinct over the applied art. Reversal of the rejections and instructions to allow all claims is therefore respectfully requested.

The Commissioner is hereby authorized to charge/credit any fee deficiencies or overpayments to Deposit Account No. 19-4293 (Order No. 12492.0047).

Respectfully submitted,



Scott D. Watkins
Reg. No. 36,715

August 15, 2006
Steptoe & Johnson LLP
1330 Connecticut Ave., N.W.
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VIII. Claims Appendix

Claim 1 (previously presented). A dielectric barrier discharge plasma cell, comprising:

a conductor adapted to receive an alternating current voltage; and

a dielectric spaced apart from said conductor, said dielectric comprising:

a dielectric substrate having a first surface nearer to said conductor and a second surface, opposite said first surface and farther away from said conductor;

a conductive coating on said second surface of said dielectric substrate, adapted to receive the alternating current voltage; and

a protective coating covering the conductive coating and located on the side of the dielectric substrate farther away from said conductor;

wherein said cell is adapted to generate plasma in the space between said conductor and said dielectric in response to the application of the alternating current voltage, said dielectric and said conductor are positioned to create a turbulent air flow therebetween, and said cell is configured for stacking with another substantially similar dielectric discharge plasma cell.

Claim 2 (original). The dielectric barrier discharge plasma cell of claim 1 wherein said dielectric and said conductor are uniformly spaced from one another.

Claim 3 (original). The dielectric barrier discharge plasma cell of claim 1 further comprising a transformer and wherein said alternating current voltage is raised from an input voltage to an operational voltage by said transformer.

Claim 4 (original). The dielectric barrier discharge plasma cell of claim 1 wherein said conductor consists of a conductor substrate and a conductor coating layer.

Claim 5 (original). The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises an electrode.

Claim 6 (original). The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises stainless steel.

Claim 7 (original). The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises aluminum.

Claim 8 (original). The dielectric barrier discharge plasma cell of claim 4 wherein said conductor substrate comprises copper.

Claim 9 (original). The dielectric barrier discharge plasma cell of claim 4 wherein said conductor coating layer comprises a catalyst.

Claim 10 (original). The dielectric barrier discharge plasma cell of claim 9 wherein said catalyst comprises nickel.

Claim 11(original). The dielectric barrier discharge plasma cell of claim 1 further comprising a plurality of spacer elements for spacing said dielectric and said conductor.

Claim 12 (cancelled).

Claim 13 (previously presented). The dielectric barrier discharge plasma cell of claim 1 further comprising an adhesion layer between said conductive coating and said dielectric substrate.

Claim 14 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer comprises titanium.

Claim 15 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer comprises chromium.

Claim 16 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer is about 400 angstroms to about 600 angstroms in thickness.

Claim 17 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said adhesion layer is sputter coated onto said dielectric substrate.

Claim 18 (original). The dielectric barrier discharge plasma cell of claim I wherein said conductive coating comprises copper.

Claim 19 (original). The dielectric barrier discharge plasma cell of claim 1 wherein said conductive coating is about 25 microns to 100 microns in thickness.

Claim 20 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said conductive coating is sputter coated onto said adhesion layer.

Claim 21 (original). The dielectric barrier discharge plasma cell of claim 13 wherein said conductive coating is sputter coated onto said adhesion layer for about 2000 angstroms in thickness and then plated onto said adhesion layer.

Claim 22 (previously presented). The dielectric barrier discharge plasma cell of claim 1 wherein said protective layer comprises nickel.

Claim 23 (previously presented). The dielectric barrier discharge plasma cell of claim 1 wherein said protective layer comprises a tin based solder alloy.

Claim 24 (previously presented). The dielectric barrier discharge plasma cell of claim 1 wherein said protective layer is about 25 microns to about 100 microns in thickness.

Claim 25 (previously presented). The dielectric barrier discharge plasma cell of claim 1 wherein said protective layer is plated onto said conductive coating.

Claim 26 (previously presented). The dielectric barrier discharge plasma cell of claim 1 wherein said second surface of said dielectric substrate is treated such that said conductive coating adheres thereto.

Claim 27 (previously presented). The dielectric barrier discharge plasma cell of claim 26 wherein said second surface of said dielectric substrate is sand blasted.

Claim 28 (previously presented). The dielectric barrier discharge plasma cell of claim 26 wherein said second surface of said dielectric substrate is ground.

Claim 29 (previously presented). The dielectric barrier discharge plasma cell of claim 2 wherein said dielectric and said conductor are arranged as parallel plates.

Claim 30 (original). The dielectric barrier discharge plasma cell of claim 29 wherein said dielectric and said conductor are corrugated.

Claim 31 (original). The dielectric barrier discharge plasma cell of claim 1 wherein said dielectric is cylindrical.

Claim 32 (original). The dielectric barrier discharge plasma cell of claim 31 wherein said conductor is coaxial with said dielectric.

Claim 33 (original). The dielectric barrier discharge plasma cell of claim 31 wherein said conductor comprises at least one cork screw shaped element.

Claim 34 (original). The dielectric barrier discharge plasma cell of claim 33 wherein said cork screw shaped element comprises a thin electrode.

Claim 35 (previously presented). A dielectric barrier discharge plasma system, comprising: a plurality of dielectric barrier discharge plasma cells, wherein each of said dielectric barrier discharge plasma cells comprises: a conductor adapted to receive an alternating current voltage; and a dielectric spaced apart from said conductor, said dielectric comprising: a dielectric substrate having a first surface nearer to said conductor and a second surface, opposite said first surface and farther from said conductor; and a conductive coating on said second surface of said dielectric substrate, adapted to receive an alternating current voltage; wherein said dielectric and said conductor are positioned to create a turbulent air flow therebetween, said cells are generally rectangular in cross-section and are adapted to generate plasma in the space between said conductor and said dielectric, and said plurality of dielectric barrier discharge plasma cells are arranged radially.

Claim 36 (previously presented). A dielectric barrier discharge plasma system, comprising: a plurality of dielectric barrier discharge plasma cells, wherein each of said dielectric barrier discharge plasma cells comprises: a conductor adapted to receive an alternating current voltage; and a dielectric spaced apart from said conductor, said dielectric comprising: a dielectric substrate having a first surface nearer to said conductor and a second surface, opposite

said first surface and farther from said conductor; a conductive coating on said second surface of said dielectric substrate, adapted to receive an alternating current voltage; and a protective layer covering the conductive coating and located on the side of the dielectric substrate farther away from said conductor; wherein said dielectric and said conductor are positioned to create a turbulent air flow therebetween, said cells are generally rectangular in cross-section and are adapted to generate plasma in the space between said conductor and said dielectric, and said plurality of dielectric barrier discharge plasma cells are stacked.

Claims 37-57 (Cancelled).

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

None.